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VOICE OF THE ELECTRIC UTILITY INDUSTRY

LATE NEWS

EPA proposes rules to exclude most pollution-control changes from new-source review—the long-awaited "WEPCo fix."
Long Island Lighting's 345-kV, 26-mi submarine cable crossing operated commercially on 6/10.
Two transmission ties and joint U.S.-Mexican power plants were suggested in a joint DOE study.
Lightning caused a transformer fire and shutdown of the 186-MW Yankee Rowe nuclear unit.
Senate confirmation of Ivan Selin to replace NRC Chairman Kenneth Carr was expected by July 1.

PSNH emerges from Chapter 11

Public Service Co. of New Hampshire emerged from bankruptcy protection in late May, ending one of the more bizarre developments in recent electric utility history.

If regulatory approval is received, next step in the recovery of PSNH will be its acquisition by Northeast Utilities.

PSNH made headlines the world over with a Jan. 28, 1988, voluntary filing for bankruptcy protection from debt related to the long-delayed Seabrook nuclear plant.

PSNH emerged from bankruptcy on May 16, 1991, with $2.3 billion of new financing and seven years of 5.5-percent of rate increases. The company plans to be acquired by Northeast Utilities by fall. New Hampshire state regulators estimated a minimum of $300 million of synergies possible in the combination. Federal and state approvals are still needed.

During 1988 and 1989 the bankruptcy was costing $1 million a month in legal and consulting fees, said Frank R. Locke, Northeast Utilities senior vice president and chief administrative officer-New Hampshire. The bankruptcy started with a $500 filing fee and finished with a bank transfer of $1.5 billion for distribution of money to holders of PSNH secured and unsecured debt.

"Fortunately," Locke said, "all parties recognized that the way to end a bankruptcy that was stifling the state's economy was through compromise and not through a decade of litigation."

Other financial transitions

Mergers and severe financial developments involve utilities in other regions. Companies in Iowa, Colorado, Arizona and Massachusetts are affected.

- The Securities and Exchange Commission cleared the way for July 1 merger of Iowa Southern Utilities and IE Industries by continuing exemption under the Public Utilities Holding Company Act. Formation of IES Industries, was OKd by shareholders in May.
- In Colorado, Colorado-Ute Electric Association, under Chapter 11 since March 1990, is reviewing two reorganization plans. Public Service Co. of Colorado and PacifiCorp submitted one plan, and Tri-State Generation and Transmission Association another.

Continued on page 13

Photo by U.S. Army Corps of Engineers

Corps, contractors repair Kuwait lines

KUWAIT CITY—Kuwait Emergency Recovery Office (KERO) advance team installs a spacer on the 40-km transmission line under repair from Al-Zoir power station to the Shuaiba substation. Oil well fires set by retreating Iraqis darken the sky. U.S. Army Corps of Engineers, Kuwaiti counterparts and contractors also completed emergency repairs to a major substation on 6th Ring Road, restored airport power and surveyed 64 damage sites as of late May. Corps contractors started work on four more transmission lines and the Fintas "W" substation. Three lines running 23 km from the Doha power station to Omeriya were repaired first (*EL&P*, p.6, 6/91).

WEPCo takes Edison Medal

SAN DIEGO—Wisconsin Electric Power Co. has won the 1990 Edison Medal, the investor-owned electric utility industry's highest honor. The award was made at the Edison Electric Institute's 5th Annual Convention here on June 5.

The company was recognized for its success in combining environmental stewardship with a high level of service to its customers.

EEI Chairman Jim Harlow, chairman and CEO of Oklahoma Gas & Electric Co., called the effort "more than just a statement of responsibility to preserve the nation's resources." He lauded WEPCo's follow-through that "demonstrated that earnest commitment to the environment and good business can be compatible goals."

The company earned the award for its community programs that promoted cooperation among the company, industry, the public and environmental groups. It sponsored Vision 2000, a community forum that pulled together more than 200 business, environmental, regulatory and educational leaders to discuss ways to reach consensus on environmental issues.

WEPCo also created an appliance rebate program that encouraged customers to turn in old, inefficient refrigerators and air conditioners and receive, in return, U.S. Savings Bonds. This enables the company to reduce demand. WEPCo also recycled the chlorofluorocarbons (CFCs) and metals from the turned-in units, rather than merely landfilling them. Almost 200,000 appliances were turned in, reducing landfill space by nearly 4-million ft^3 and recapturing about 18,000 lbs of refrigerants.

RESERVED FOR MAILING LABEL

BPA and BG&E win 2nd annual *EL&P* substation design contest

BARRINGTON, IL—Bonneville Power Administration and Baltimore Gas & Electric Co. won *EL&P*'s Second Annual Substation Design competition.

BPA's Pacific Northwest-Southwest HVDC Intertie Expansion captured top honors in the engineering/operations design competition. BG&E won the aesthetic design competition.

BPA modernized the Celilo Converter Station and was the first to use parallel converters in daily operation.

The substation, dedicated as the Eugene Starr Complex, raised the Intertie's capacity by 1100 MW (55 percent) to meet the demand for more effective service between Oregon and California.

It was completed in four years at a cost of $94.6 million and is expected to increase power revenues by $10-$35 million per year.

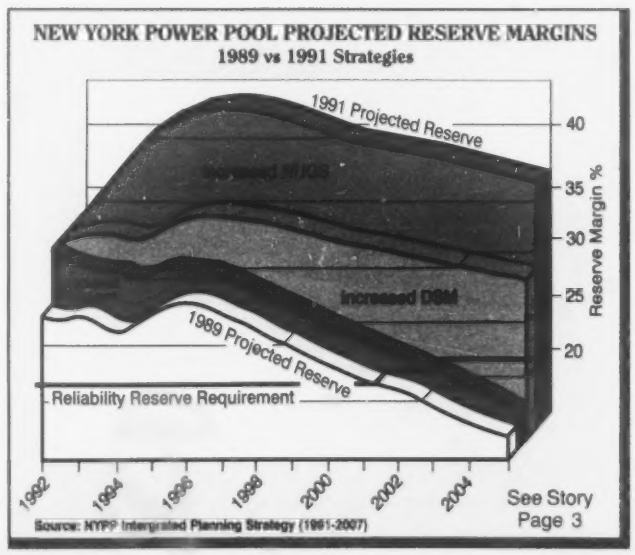
BG&E's Concord Street Substation, located on a two-thirds-acre site at the east end of Baltimore's Inner Harbor Development, took top honors in the aesthetic design competition.

BG&E engineers worked with city planners and a BG&E real estate development subsidiary to develop plans for the substation on the bottom floors of a 350,000 ft^2 office tower.

Other facilities reviewed include:
- New York Power Authority's North Transition Station (NYTS).
- Lansing (MI) Board of Water and Light's 138-kV Northeast Substation.
- Florida Power & Light Co.'s (FPL) Miami Substation.
- SRP's Noack Substation.

An independent panel of six judges named the winners.

The full report on award-winning substation design innovations starts on p.16.



News Briefs

JILL MINNER, Special Projects Editor

Settlement reached in Grand Gulf case

Entergy Corp. announced that it has reached an agreement with utility regulators involving its investment in the Grand Gulf 1 nuclear unit. The settlement lowers Entergy's Grand Gulf return on equity from 14 percent to 13 percent and is retroactive to April 1990. Regulators had been seeking a reduction to 12 percent, according to Entergy.

The company said a refund will be divided between Entergy ratepayers in Arkansas, Louisiana, Mississippi and New Orleans based on percentage of entitlement to power from Grand Gulf. The refund will reduce 1991 rates by approximately $61 million, and 1992 revenues will be lowered by about $27 million, with declining amounts thereafter.

Also included in the settlement was a revision of the decommissioning fund allowed on Grand Gulf. The fund, which will cover the dismantling of Grand Gulf when its license expires in 2022, was increased to $220 million of principal. In 1985 the principal was set at $93 million, according to the company.

Entergy said it expects the settlement to be approved by the Federal Energy Regulatory Commission sometime this summer.

Tighter restrictions placed on unescorted access to nuclear plants

The Nuclear Regulatory Commission is placing tighter restrictions on individuals with unescorted access to protected and vital areas of nuclear power plants. In order to protect against the threat of radiological sabotage, the commission said it is amending its regulations to require plant licensees to establish an access authorization program.

The program must include three elements: background investigation, psychological assessment and behavioral observation. According to the NRC, the program will help insure that plant personnel with unescorted access are trustworthy and reliable.

The commission said nuclear power plant licensees have until April 25, 1992, to incorporate and implement the required authorization program into their site physical security plan.

Puget Power task force studies reliability

A reliability review team made up of representatives from a variety of departments at Puget Sound Power & Light Co. is investigating ways to improve the utility's current level of service. "This task force wasn't a knee-jerk reaction to the Arctic Express in December," stated Ron Bailey, Puget Power vice president-power systems. "We wanted the whole issue of reliability studied."

According to Puget Power, the team presented a proposal to senior management on June 1. In addition to service reliability, the team studied a number of areas including: outage statistics, T&D System Planning Guidelines, work practices, computer systems, equipment maintenance practices, customer perceptions, and current outage reporting procedures.

Calvert Cliffs improves

Baltimore Gas & Electric Co.'s Calvert Cliffs nuclear power plant is showing continued improvement, according to the Nuclear Regulatory Commission's Initial Systematic Assessment of Licensee Performance Report.

In its report, which covered the period from Jan. 1, 1990, to March 31, 1991, the NRC stated that Calvert Cliffs' "performance improvement program continues to make progress toward improving overall operations and interdepartmental communications. The organizational changes have also been effective in assuring good communications and in emphasizing a good safety perspective for all site activities."

The plant was rated in seven categories and received one superior rating and six good ratings. "Our long-term goal is to establish Calvert Cliffs as one of the superior nuclear power plants in the country," stated George C. Creel, BG&E vice president of nuclear energy. "This SALP report is a confirmation that we are moving forward and our workers should be commended, but there is always room for performance improvement," Creel added.

Coal conversion saves NEP customers $340M

New England Power, a subsidiary of New England Electric System, said it has saved customers $340 million from 1981 to 1990, by converting two of its major power plants from oil to coal. "The benefits derived from burning coal at our Salem Harbor and Brayton Point plants are numerous," explained NEP President George Sasdi. In addition to the savings customers realized, "we've reduced our use of foreign oil by approximately 50 percent, and coal burning has had important environmental benefits," Sasdi continued. "Converting our plants to burn coal has resulted in reducing particulate emissions by about three-quarters and sulfur dioxide emissions by about 20 percent, keeping our power plants' emissions well within regulatory limits."

Three generating units at NEP's Brayton Point Station were converted to coal in 1982, and three units at the utility's Salem Harbor Station were converted in 1984.

Personnel briefs

Richard A. Abdoo was appointed chairman, president and chief executive officer of **Wisconsin Energy Corp.** He succeeds Charles S. McNeer who retired May 1.

Iowa-Illinois Gas & Electric Co. President and Chief Operating Officer Stanley Bright was named to the additional post of chairman and chief executive officer. Bright replaces Barry O'Brien.

Timothy L. Guzzle, president and chief executive officer of **TECO Energy Inc.**, was elected chairman of the company. He succeeds H.L. Culbreath who has retired.

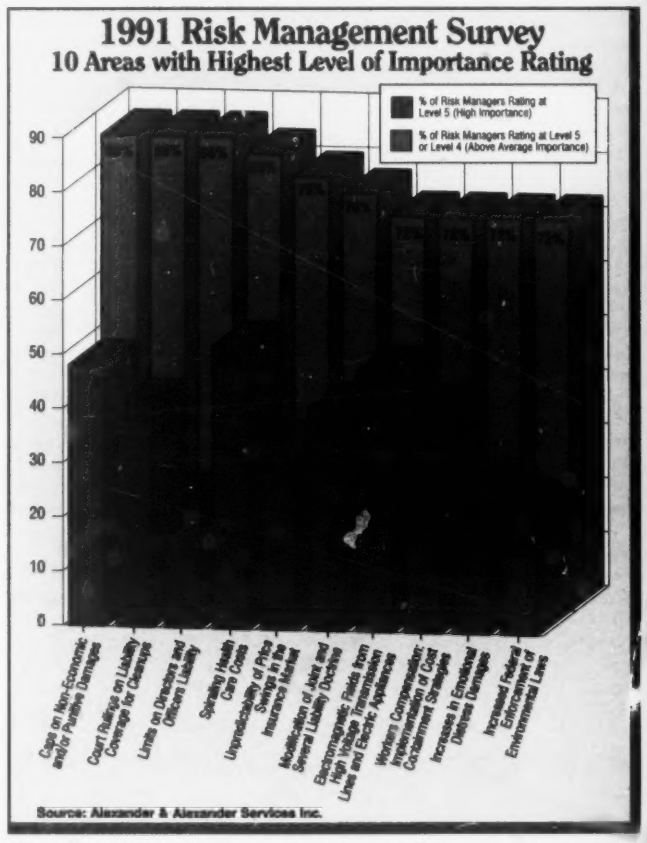
Commonwealth Edison Co. Chairman and Chief Executive Officer James J. O'Connor was appointed chairman of the **U.S. Council for Energy Awareness**.

Jack E. Thomas, executive vice president and chief operating officer of **San Diego Gas & Electric Co.**, was named president of the Pacific Coast Electrical Association.

General Public Utilities Corp. Chairman, President and CEO Standley H. Hoch has resigned for "personal reasons" because of "actions which he concluded diminished his effectiveness."

Kenneth A. Roe, chairman of **Burns & Roe Enterprises,** died of heart failure on June 4, in Ft. Lauderdale, FL.

Environmental cleanup liability, jury awards top list of utility concerns


1991 Risk Management Survey
10 Areas with Highest Level of Importance Rating
% of Risk Managers Rating at Level 5 (High Importance)
% of Risk Managers Rating at Level 5 or Level 4 (Above Average Importance)
90
80
70
60
50
40
30
20
10
0
Caps on Non-Economic and/or Punitive Damages
Court Rulings on Liability Coverage for Cleanups
Limits on Directors and Officers Liability
Spiraling Health Care Costs
Unpredictability of Pollution Liability Insurance Market
Modification of Joint and Several Liability Doctrine
Electromagnetic Fields from High Voltage Transmission Lines and Electric Appliances
Workers Compensation: Preemption of Cost Containment Strategies
Increases in Emotional Distress Damages
Increased Federal Enforcement of Environmental Laws
Source: Alexander & Alexander Services Inc.

Top utility business concerns are court rulings on environmental cleanup liability, caps on non-economic and/or punitive damages, and limits on directors and officers liability, said 86 percent of respondents to a recent national survey (see table).

The risk management survey, conducted by Alexander & Alexander Services Inc. (A&A), revealed other issues considered critical, such as modification of the joint and several liability doctrine and increases in emotional distress damages.

"Enormous costs of litigation and unpredictable liabilities arising from environmental hazards threaten the financial stability of American utility companies," explained A&A Senior Vice President Robert H. Moore.

In the area of health care costs, 83 percent of utility executives reported apprehension about corporate medical expenditures.

Additional areas of concern include broadened federal enforcement of environmental laws and employee safety from electromagnetic fields of high-voltage transmission lines and electric appliances (*EL&P*, pp.1, 8, 3/91).

A&A said typical survey respondents included executives in companies with sales of at least $250 million, with almost half generating sales of at least $1 billion. While the survey focused on 90 legislative and regulatory issues, a breakdown of the types of utilities surveyed is not available, according to Barbara Rosenbaum, a spokesperson for A&A.

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COMMENTARY

Franchise negotiations: Loud and showy in Chicago

When is a reliable system unreliable? The answer? When it's politically expedient to declare it so. Ask Commonwealth Edison, a favorite electric utility just down the road a piece from our offices.

CECo has been negotiating a new franchise agreement with the City of Chicago for nearly a year-and-a-half. The current agreement ends Dec. 31. True to its reputation, the city government has launched a full campaign of verbal pyrotechnics and accusations to build its case for a better deal. As previously reported, it has threatened to take over and operate the utility system in the city. The most recent charges are that CECo's Chicago system is archaic, maintenance lags the rest of its system and service is unreliable.

Negotiations moved along smoothly last year until the city was hit with a severe summer heat storm, meters whirled, equipment and people became superheated. Two substation fires blacked out between 60,000 and 65,000 residents...some for up to three days. Then in March, CECo received a $572-million rate increase. The double whammy changed the playing field.

Chicago officials screamed. In Chicago politics, "facts" are what the politicians in power say they are. The only thing that counts is making your point (just like in craps) while you're still in control. City Hall pols charged the "facts" showed CECo wash operating an antiquated system, failing to maintain its equipment, threatening the lives of residents with toxic chemicals (PCBs in transformers), overcharging customers...and generally running an unreliable electric system.

The Illinois Commerce Commission, which regulates electric utilities in the state, will complete its invesigation of the substation fires and CECo's reliability next spring...too late for consideration by the city before the franchise runs out. So the city launched its own investigation to show how bad CECO's service reliability really is.

But sometimes nothing you plan goes right. After conducting his study, the city's consulting engineer reported that CECo's operations were (gasp) reliable.

But wait, city officials demanded...whose data did was used in the consultant's study? Why, CECo's, of course, the consultant replied. "Aha," shouted Councilmen, "just as we thought...you've been brainwashed," or words to that effect. This prompted the head of the mayor's utility task force committee to ask, "So where should he have gotten data? Disney?"

The fireworks appear likely to continue for a while, but eventually calmer minds will prevail. What the City Council really wants is lower bills for residents, especially low-income residents, which would build voter support. It also wants stronger conservation efforts from the utility; a shorter term than the 40-year franchise that's running out; monthly, instead of annual payment of the franchise tax (which politicians and the media call a "fee") and hopefully, an increase from the current 4-percent of revenues rate.

CECo counters by seeking reduction or elimination of the franchise tax rate and insists on a 40-year agreement.

Despite all the shouting and verbal sabre rattling, the city *won't* make a real effort to buy out CECo's Chicago system. First, it has its hands full running even a garbage-disposal system, much less a complex, carefully balanced electrical network Second, the city would be hard pressed to raise the money necessary to buy out Edison's properties. And third, takeover of the CECo system would mean that the city stands to lose the present 17 cents of tax revenue it collects from every dollar of revenue CECo receives from Chicago customers-...not an insignificant factor to the economically stressed city.

No, Chicago officials—both elected and appointed—may be loud, crude and singularly politically motivated. But they aren't stupid. They'll charge inappropriate management, faulty procedures, underhanded and even illicit personal transactions, loudly and consistently in the local media. But in the end, there *will be* a new franchise agreement. The city will get some of its wish list 'demands'. CECo will receive the official blessings of the mayor and city council; CECo electricity will continue to run over CECo lines to its Chicago customers

It's a fact of life. Politicians must do something to stay in the public eye.

But like I said, they aren't stupid!

Robert A. Lincicome, Editor-in-Chief

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New video explores power quality needs in layman's terms

ST. PETERSBURG, FL—Solutions to residential customers' power quality problems are addressed in a 20-min. video now being made available to U.S. electric utilities. Produced in the style of the popular "This Old House" television program on public television, the video explains in down-to-earth, easy-to-understand terms why power quality should be a concern to customers, and what those customers can do to protect sensitive electronic devices.

A printed viewer guide accompanies the video.

The information presented is designed to help utility customer contact personnel respond in a positive manner when confronted by customers with residential power-quality problems.

Aimed at consumer

Robert S. Mason Jr., president of Bayboro Consulting Group Inc., serves as the moderator of the video and takes viewers on an electrical tour of a typical home—from the meter through the wiring to sensitive electronic equipment inside the house.

Bayboro produced the material in cooperation with the National Rural Electric Cooperative Association (NRECA), the electric cooperatives' trade organization.

Mason notes that the average American home is loaded with sensitive electronic equipment, such as big-screen TVs, home entertainment centers, personal computers and the like. Most consumers don't know they should protect these valuable assets...and if they do know, have a hard time finding out just how to do it.

"Did you ever try to buy a surge suppressor from a retail clerk?" Mason asks. "Take my word for it, folks. That can be a very frustrating experience."

Protection all around

Mason suggests building an electronic fence around a home to ensure that expensive electronic equipment is protected from normal electrical transients and voltage surges caused by lightning.

He points out that protecting a power line alone is insufficient to prevent damage to TVs and VCRs served by TV cable. Similarly, he says, phone lines also must be protected. "These lines—power, cable and phone—are three electrical gates into the house. These three gates must be kept closed at all times," he explained.

Mason describes an electronic fence as a lightning arrester installed at the meter and surge suppressors plugged into all wall outlets serving electronic equipment. He points out that dual protection—power-and-phone and power-and-cable—are available and should be used wherever appropriate.

The arrester handles the voltage surge from a nearby lightning strike and the suppressors handle the rest of the problems. He adds that no combination can protect against a direct strike.

Joint effort

Bayboro, part of Florida Power Corp., produced the tape and viewer guide to demonstrate how people have a source for answers to their power quality problems—their local electric utility. NRECA has the right to market the materials to co-ops, and Bayboro has the right to distribute them to all other electric utilities.

Utilities may buy a three-quarter-in. VHS master and duplicative masters for the viewer guides for $3,500, which includes full rights to reproduce the materials. A second option is to buy a half-in. VHS video and 25 viewer guides for $525.

In addition, Bayboro has produced a booklet that provides essentially the same information as the video. It also includes a walk-through equipment checklist that a homeowner can use to determine the protection needed.

For additional information, investor-owned utilities may contact Bayboro Consulting Group, 2951 34th Street South, St. Petersburg, FL 33707, (813) 866-9494. Electric cooperatives should contact NRECA at 18100 Massachusetts Ave., NW, Washington, DC 20036, (292) 857-9500.

Utilities may benefit from telco partnering

WASHINGTON—Competition and cooperation will be two of the questions examined in an upcoming seminar, "Telcos, Powercos and Cablecos—Rivals or Partners in the Local Loop?"

Issues to be addressed

The PennWell Conference, to be held Sept. 12-13 at the Hyatt Regency in Bethesda, MD (a Washington, D.C. suburb), will address issues including:

- Cost-effectiveness of utility cooperation among electric, gas and water utilities.
- Partnering with electric utilities on telemetry systems.
- Telephone utilities providing customized or enhanced local communications for electric utilities, including fiber optics.
- Power challenges for fiberoptic networks.
- Partnering opportunities for utilities and providers of local-loop communications.

Speakers and instructors include legal and technical experts from various utility and telecommunication companies and from industry suppliers.

More information

For more information contact Laura Ariane, PennWell Conferences, 713/621-9720.

Public Service of CO orders new SCADA/EMS

DENVER—Public Service of Colorado (PSCo) has announced that it will replace its supervisory control and data acquisition and automatic generation control with a new energy management system (EMS) supplied by ESCA Corp., Bellevue, WA.

Contract value

The contract is valued at $3-5 million. PSCo expects to complete the replacement relatively soon since it is derived from ESCA's energy management platform, a fully integrated and tested system.

The new system will also support distribution automation applications. ESCA will develop a new product that provides two-way transfer of information between relational databases and the real-time databases used by HABITAT, ESCA's operating environment.

Generating capacity

PSCo and its subsidiaries supply electricity and natural gas to 70 percent of Colorado, as well as to Cheyenne, WY. It has a generating capacity of 3265 MW and serves approximately 999,000 electric customers.

HENRY STEIN, Senior Editor-Generation

Cyclic operation needs flexible plant automation to succeed

CHICAGO—Flexible automation is the key to cyclic operation of power plants. But flexible automation strategies must be easily configurable by the user or the vendor.

As the power industry assumes a larger share of system load regulation requirements, more power plants are undergoing cyclic operation. Plant controls and monitoring need improvements to handle this cycling, said Robert N. Hubby of Leeds & Northrup Co. at the American Power Conference in Chicago in late May.

Requirements

He described some of the industry cycling requirements as:

- After an 8-hr shutdown, take a subcritical unit from first fire to full load in 90 min, and in 120 min for a supercritical unit.
- Turndown to 25 percent of full load, or less, without using supplementary fuel.
- Hold steam temperature deviation from setpoint during normal load changes to ± 10°F.
- Limit NOx and other environmental emissions to meet or exceed regulatory requirements. Automatically control maximum load change rates based on evaluation of the unit's ability to support sustained load ramp.
- Include the entire plant, especially auxiliary equipment and systems, in the coordinated control system.
- Utilize knowledge-based expert systems.

Hubby maintained that the key element that had to precede any application of advanced automation for cycling operation was sound boiler turbine control strategy that would allow the unit to respond to changing loads.

A well-designed, well-tuned boiler control system operating at fixed pressure—unlimited by controlled auxiliaries—typically can handle sustained load ramps of 5 percent per min over the full regulating range of the unit. Shorter load spans of approximately 10 percent can support rates of 10-20 percent per min.

For variable-pressure operation, the maximum sustained load ramp typically is 1-2 percent per min. It is limited primarily by the allowable stresses on the major boiler pressure components, such as drum metal temperature.

Four areas of equipment and strategies must be improved to safely and economically attain these cycles:

- Supervisory controls for advanced control and management of major auxiliaries.
- Extension of online performance calculations to support management of controllable losses and online calculation of unit heat rate.
- Coordination with energy management system to provide pertinent unit performance and capability data to improve response to area generation control and economic dispatch operations.
- Automated system tuning.

Supervisory controls

The four areas where supervisory control improvements would help in plant cycling are: automatic turbine startup and shutdown; burner management and furnace safety; automatic startup and shutdown of unit auxiliaries; and variable-pressure programming, noted Hubby.

These areas need two modes of control—a supervisory mode where the operator follows a sequential checklist to guide necessary plant actions and an automatic mode where the control system initiates necessary plant actions, except where operator decisions are necessary.

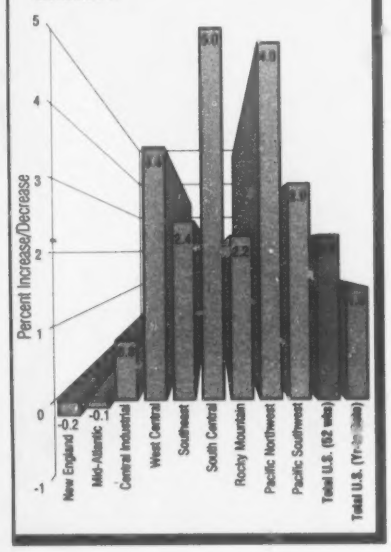
Online performance assessment

Because controllable losses must be

Continued on page 22

ELECTRIC OUTPUT Still Growing

Net electric output from the Mainland U.S. electric utility industry increased for the 52 weeks ending May 11, as reported by Edison Electric Institute. Two geographical EEI regions, however, showed a decrease.



Fight zebra mussels with ship materials?

TORONTO—The Japanese have developed a cupronickel cladding for ships that may be applicable to the zebra mussel problem some utilities are beginning to experience at their power plants in the U.S.

The anti-fouling cupronickel-clad steel plates reject marine flora and fauna, and currently are being applied as ships' bottom shells and marine piping. The 0.5-mm-thick cladding material is available in Cu90/Ni10 and Cu70/Ni30.

Proof tests

A series of year-long field tests were performed on both types by NKK Corp., the Tokyo marketer, and Sakai Iron Works Co. Ltd. at Japanese coastal locations, according to the Nickel Development Institute. The tests showed that the cupronickel-clad plates resisted fouling much better than UNS S 31603 stainless steel, aluminum-bronze and a tar-epoxy coating.

Now a 90/10-clad sample is being comparison tested at sea attached to a ship of the Institute for Technical Research of Ships, Japan Ministry of Transportation.

Contractors see August '92 finish for new Shanghai generating plant

The Shanghai, China, area expects to have two new 600-MW units with supercritical, once-through boilers and single-reheat, condensing turbine-generators in August 1992. The facility is located in the town of Shengciao, which is 27 km (about 17 miles) northwest of Shanghai on the Yangtze River. In the foreground of the picture is one of two bucketwheel stacker/reclaimers that can stack coal at 3000 tons/hr and reclaim it at 300-1800 tons/hr. Sargent & Lundy is doing the plant design work and also leading a consortium that is overseeing the design and supplying all equipment. Coal-handling system subcontractor, McNally-Wellman Co., supplied the photo.

Waste-burning capacity growth slows

NEW YORK—Developing and building waste-to-energy projects is not the growth business it was several years ago. Using the most recent figures available, Kidder, Peabody & Co. found that only 6000 tons per day of project capacities were awarded through the first 10 months of 1990.

Industry trends

In addition, Kidder revealed that although awards rose 24 percent in 1989 over 1988's, almost one-third of the new ones were dropped by July of '89. The number of new contracts remained essentially flat, about 13,000-14,000 tons per day capacity, from 1986 to '89.

Another industry trend has been to larger facilities—capacities of 400 tons per day and more. Prior to 1984, more smaller plants than larger ones were contracted for and built. Since 1988, only one or two small plants per year have been awarded.

Driving forces behind this trend include higher profitability in building larger facilities and better long-term environmental and operating histories of larger, state-of-the-art burn plants. The larger units also have economies-of-scale in garbage processing, site choice and project funding.

According to the Environmental Protection Agency, people and industry in the U.S. generate about 493,000 tons per day of municipal solid waste (MSW). Approximately 14.2 percent of this MSW (70,000 tons per day) goes to waste-to-energy plants. As recently as 1970, less than 1 percent of all MSW was incinerated in such plants. Most of the growth in this sector of the solid waste disposal market took place in the mid-'80s.

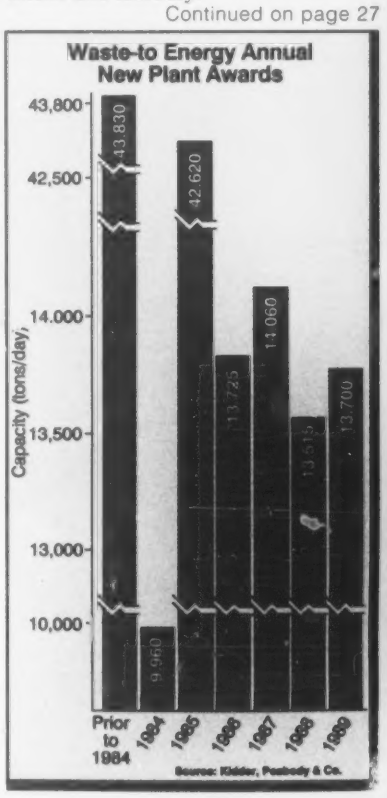
The good, the bad

Advantages of burning MSW in waste-to-energy plants include:

- Producing electricity and/or steam from waste.
- Reducing decomposable organic matter to inorganic mass.
- Reducing the volume and weight of MSW by 90 percent and 75 percent, respectively, thereby conserving landfill space.

However, burning garbage produces air emissions and ash residue. The Clean Air Act Amendments may adversely affect waste-to-energy plants because of their emissions, which may include combinations of dioxins, furans, SO_2, NOx, carbon monoxide, lead, cadmium and mercury.

Continued on page 27



from page 24

Changing analog to direct digital controls...

tors should help with layout and operational graphics. Every plant is different, so it follows that the people who work with the unit on a day-to-day basis often know the kinds of information that help them handle various scenarios.

The supplier, conversely, because of intimate knowledge of his/her own equipment and system, should design the initial control graphics.

Graphics

The term "control graphics" identifies the bare minimum faceplate-type displays (see figure). These graphics should provide the best, most concise organization of control faceplates.

Operators should not have to learn a menu format or hierarchy. Getting from one place to another in the display system should be as intuitive as it was for the analog control board.

In the example shown, the display of typical Boiler Master software, the top menu represents plant areas. By selecting one area, the operator can get more information about that area, just as when walking to a specific part of the control board.

The graphic adheres to a specific format—the upper-right location represents the primary control parameter for that "page." Subordinate loops are in the lower portion, with the upper-left reserved for overall plant data. The operator can reference trends, too. The operator can move from one control to another with the arrow keys located at the bottom of the screen.

Operators accept this format rapidly because it is so similar in operation to familiar analog boards.

Plant philosophy counts

It is equally important to determine the overall plant operating philosophy early in a retrofit project. Where is the primary operator interface? As mentioned earlier, all pertinent operating information must be kept in relative proximity.

For example, if all plant switch functions are to be retained on the existing board, does it make sense to force an operator to control analog devices from the CRT? Just because a control system uses digital techniques does not necessarily rule out some panel-mounted stations.

Many control vendors offer digital stations with configurable capabilities. These stations retain aspects the operator has come to rely on and offer flexibility in design.

A compromise might move relevant switches into the digital control system and retain others on the board. If this is not done, all should be operable via the CRT system.

Immediacy

Operators must receive all critical information immediately, especially pertinent alarms. At the same time, nonessential alarms must be relegated to a lower priority and visibility.

Plant alarms are usually broken down into two distinct functions. Those alarms crucial to plant operation and safety are on the large, dedicated, board-mounted annunciator panel. The rest—usually referred to as (DAS) Data Acquisition System alarms—are recognized and engineered differently in a digital CRT-based system.

Designers should also dedicate CRTs for the critical alarm functions and not mix them with other functions.

Guide to computerized maintenance methods boosts productivity

NEW YORK—A new handbook will help engineers and managers understand and obtain the maximum benefits from computerized maintenance management systems (CMMS).

The handbook is designed to be a planning tool. It contains basic information, such as what a CMMS is and how it can be utilized. Advice on selection, purchasing, implementation, upgrading and using a CMMS is included, along with diagrams and checklists to guide users. A glossary of commonly used terms rounds out the book.

Research has shown that relatively few U.S. firms currently use CMMS, according to Adrian Salee, author of the *CMMS User Handbook*, who says most firms have yet to make major investments in CMMS technology. Yet, he adds, many anticipate computerizing their maintenance management procedures within the next three years.

The *1991 CMMS Directory and Comparison Guide* provides listings of more than 100 CMMS suppliers, with their capabilities and services. It also contains detailed comparisons of the software they offer.

The directory is divided into six major

Continued on page 30

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Waste burning...

Ash is collected in two main parts of a plant. The first is at the bottom of the boiler in which the garbage is burned. This "bottom ash" makes up about 90 percent of total ash produced.

The second is in the particulate-removal portion of the air-pollution-control equipment. This "fly ash" typically contains much higher concentrations of potentially toxic substances.

Copies of "Waste-to-Energy Industry: 1990 Awards: Business Remains Sluggish" cost $190; those of "Waste-to-Energy Industry: An Examination of Major Obstacles to Growth" cost $175. Both are free for subscribers to the "Kidder, Peabody Waste-to-Energy Database printout," which lists all projects identified in a survey in the U.S. and Canada and costs $365. Contact: Marion S. Brown, Manager-Information Services Marketing, Kidder, Peabody & Co. Inc., 10 Hanover Sq., New York, NY 10005; 212/510-3770.

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WAYNE BEATY, Senior Editor—T/D

EPRI, BPA host symposium with Soviets

PALO ALTO, CA—A symposium on high-voltage transmission was hosted by the Electric Power Research Institute (EPRI) and Bonneville Power Administration (BPA) with the U.S.S.R.

EPRI has had a long-standing relationship with the Soviet R&D counterpart (VNIIE) the All-Union Electric Power Research Institute. BPA also has had a working relationship with the Soviet Union.

The meeting was held in Palo Alto May 20-21 and in Portland, OR, May 22 with a field trip to the HVDC Celilo Converter Station.

Participants discussed the two countries' design and operation of transmission systems and shared technology that might be helpful for each.

BPA cofunded part of the meeting and participated to share information about its extensive transmission system and experience with 500-kV through 1100-kV lines.

The high-voltage network in the Soviet Union consists of 500-kV and 750-kV lines with capacities of 1800-2300 MW. In western, highly populated areas, the 750-kV network is superimposed over a 330-kV network, which has a capacity of about 300-400 MW.

In the south regions, the Soviets use 500-kV lines superimposed over a 220-kV network. The same philosophy is carried out in Siberia and Kazakhstan where the first 1150-kV lines have been constructed.

Future plans calls for the system to gradually migrate toward 1150-kV lines superimposed over a network of 500-kV lines.

Taking into account the large territory of the Soviet Union, and for the sake of economy, the 1150/500-kV system will normally use a single circuit as opposed to the U.S.'s and Canada's trend to use multiple circuits on a single structure.

By designing for only one circuit, the question of reliability is an important one for the Soviets. They use automatic reclosing in the most simple, cheap and effective way possible to achieve a reasonable level of reliability.

Three-phase automatic reclosing is used where arc quenching is a problem. Three-phase reclosing is used as the main type of protection for lines up to 110 kV where the chance of multiphase damage is relatively high.

The 220-kV lines and lines of higher voltage are equipped with combined automatic reclosing, which for a single-phase failure works as single-phase reclosing. Multiphase failures work as three-phase reclosing.

As voltages increase on Soviet lines, so does reliability. The 110-kV lines have an average of 3.0 failures/year for 100 km. Failures for other voltages are: 1.5 for 330 kV; 0.6 for 500 kV; and 0.2 for 750 kV.

There is lots of room for improvement. The Soviets admitted that many outages could be eliminated with more automatic reclosing. They estimated improvement of 60-90 percent for 110 kV; 70-85 percent for 287-550 kV; and 65-75 percent for 735- to 765-kV lines.

Outages are caused by similar things worldwide: lightning, other weather-related outages, insulation failures, wind, fire, galloping, equipment failure, etc.

A comparison of outages on 750-kV lines in the Soviet Union and Canada is shown in Table 1.

Table 1. Failures on 750-kV lines

Reason for failure:	USSR % caused by:	Canada % caused by:
Manufacturing, assembly, or maintenance	13.7	21.1*
Ice, snow, galloping	3.8	
Wind	20.6	
Thunderstorm	20.0	
Insulation breakdown	10.6	52.1
Fire, mechanical	13.8	5.7
Unknown	17.5	21.1

*includes first two reasons

Other Soviet presentations

Other presentations by the Soviets included:

- Overvoltages, lightning surges and line protection.
- Electric and magnetic field limits.
- Radio and TV interference.
- Maintenance of insulators.
- Audible noise problems.
- Line and tower designs.

Soviet EF criteria

The limits for electric gradients for Soviet lines are shown in Table 2.

Table 2. Limits for electric fields

Locations:	kV/m
Inside living space	0.5
Outside houses	1.0
Populated areas outside house zone	5.0
Road crossings	10.0
Roads and agricultural zones	15.0
Inaccessible and guarded areas	20.0+

BPA presentations

Bonneville Power Administration en-

Continued on page 34

Fleet standardization economic, but is not first choice for most

WILLIAMSBURG, VA—Should utilities standardize fleet vehicles?

Gary A. McAlexander, president, Baker Equipment Co. has been encouraging this idea for decades. His latest appeal was made at the Electric Utility Fleet Managers' Conference in June 1990. Subsequently, he and representatives from electric utilities and contractors debated this question at length.

After observing both manufacturer's design planning and actual field operations, McAlexander concluded that a unit that promises maximum production at the job site while offering the most requested options would best satisfy requirements and be profitable for the industry.

"Standardization would promote faster delivery, simplified training, higher quality, better parts service, lower administrative costs and lower acquisition costs," McAlexander said.

Duke Power's experience

Duke Power is often seen as a forerunner in establishing the standards of utility vehicles used by the industry today. Bill McElhaney, manager, transportation services, said that Duke Power entered into a joint venture with a contractor in 1971 to standardize the entire truck fleet. "The cost effectiveness made sense and the trucks would do the job we intended for them to perform," said McElhaney.

Duke recognized that the expense of ordering custom-space trucks was not effective. Today, all of Duke's vehicles have standard bodies with the only exception being the front-wheel drive vehicles needed for mountain terrain.

McElhaney said that formerly a job might take a 7-10 man crew but now takes only a crew of two because of the technological advances in standard equipment.

The process of standardizing for Duke took only one year to implement. "Acceptance of a new line truck is often a major issue for the crew," McElhaney said, "but the new arrangement was not difficult for others to accept. It actually made day and night shift worker transitions smoother for maintenance crews."

Contractor also benefits

Henkels & McCoy Inc. uses its nationwide operations as an opportunity to purchase standardized equipment inexpensively. James J. Lafferty, operations manager, said, "This way, we keep our internal equipment rates down and pass the savings along to our customers." Another advantage to large operations is that parts are readily available.

Training time for operators and mechanics is also a factor in standard equipment.

Georgia Power

Hans A. Hanson, superintendent of fleet support at Georgia Power Co. has followed the debate over standardization for nearly three decades. Hanson recalls 20 years ago when Georgia Power formed an auto study committee to implement a standardized vehicle program. Factors such as training, efficiency, cost effectiveness and parts stocking all pointed toward the benefits of standardization.

Once the program was implemented, total operating costs decreased. "Stan-

Continued on page 35

Bar coding controls inventory

ATLANTA—The General Shops at Alabama Power Co. (APC) have been using a bar code system since 1989. Edward C. DeMellier presented a paper at the recent Southeast Electric Exchange meeting in Atlanta describing APC's use of bar coding for inventory control of transformer and circuit breaker parts.

APC chose Code 39—one of four codes that are commonly used for inventory control and are applicable to transformer and circuit breaker parts. It was developed in 1975 and is rapidly becoming "the code" for industry and commercial applications.

In 1982 it was established as an official government standard (MIL-STD-1189A). The Automotive Action Group bar code standard also recommends Code 39. It is identified in ANSI standard MH 10.8M-1983. One of the reasons it has become so popular is its accuracy. The substitution error rate for Code 39 is 1 in 3,000,000 when used without a check digit and 1 in 45 trillion with a check digit.

DeMellier says that APC chose Code 39 because of its versatility. It uses both alpha and numeric characters and a variable length code that permits coding different data elements for entering into the inventory computer.

A table of valid account numbers—up to 24 alphanumeric characters long—was printed in bar code, laminated, and placed at the issues window. Now, when material is issued, the appropriate account number can be scanned.

DeMellier pointed out that devices for reading bar codes vary from the laser scanner used in grocery stores to the portable devices used by Federal Express.

Two basic approaches allow a bar code reader to be attached to a personal

Continued on page 38

500-kV loop is finally underway

BALTIMORE—The remaining portion of the long-delayed Washington-Baltimore 500-kV loop is underway and expected to be completed in spring 1994.

Baltimore Gas & Electric Co. (BG&E) selected Black & Veatch to provide engineering design, environmental permitting, licensing services, and construction management for the 35 miles of line that will complete the 500-kV loop around Washington D.C.

One 18-mile segment will be jointly owned with Potomac Electric Power Co. (PEPCO) connecting BG&E's Calvert Cliffs nuclear generating station to PEPCO's Chalk Point fossil generating station.

The other 17-mile segment will link BG&E's Waugh Chapel substation to a 10-mile segment under construction separately from PEPCO's Brighton substation.

The Calvert Cliff-Chalk Point segment will include a 4500-ft crossing of the Patuxent River with four lattice towers located in the river. Bill Kilmon, project manager for BG&E, said lattice towers and steel poles will be used for both lines to match similar structures on adjacent rights-of-way.

Carl Boermer, Black & Veatch's project manager, said the 3-yr licensing, engineering, and construction schedule is ambitious, but achievable.

The North American Electric Reliability Council (NERC) says the Baltimore-Washington loop is required to provide adequate interregional transfer capability near the Mid-Atlantic Area Council's (MAAC) southern and western interfaces and to provide adequate stability margins in the Baltimore-Washington area.

The project has been delayed for years with siting, certification, and related court actions. NERC says such open-ended approval and judicial review processes threaten timely completion of other planned transmission facilities necessary to supply customer demand, particularly, in high-growth areas within MAAC.

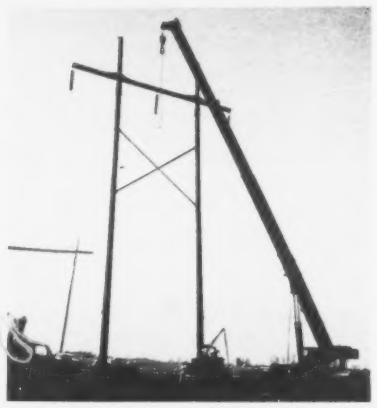
PSI replaces wood H-frames with steel

PLAINFIELD, IN—PSI Energy replaced the wood H-frames of a 230-kV transmission line in north-central Indiana with steel structures. The wood poles were destroyed in a massive spring ice storm (*ELP*, p.1, 5/91).

The shift to steel was partly because existing plans call for upgrading the line to 345 kV within the next 10 years.

Another major consideration was time. Arnie Poppens, senior engineer, PSI Energy, said, "We needed to restore service in the fastest possible time, so we asked Meyer Industries to initiate its LD Steel Express service. They had the materials on hand and the design was compatible with our specifications."

"Replacing the poles with wood would have required 342 poles, with over 200 of them in the 100-126-ft H-1 class range. Finding that many poles of that size quickly was unlikely at any price," said Poppens.



PSI Energy crews replace 171 wood H-frame structures with new steel H-frames following spring ice storm. Steel was used because it was quicker and also for future upgrading of line

The 230-kV circuit linked the Cayuga coal-fired plant with the transmission grid and several key substations.

Ron Randle, vice president, Meyer Industries in Hager City, WI, said, "In addition to having a large stock of steel poles, we use an existing steel H-frame design that perfectly suited PSI Energy's requirements."

Construction crews were able to start replacement less than three weeks after the storm and expected to have the new line energized by July 1. Span length remains the same 875 ft on average, but the steel structures will be 15-ft higher—about 90 ft above grade on average.

The weathering steel poles will be direct-embedded with a crushed rock backfill.

Co-op upgrades EMS/DA system

MANASSAS, VA—Northern Virginia Electric Cooperative (NOVEC) is upgrading its energy management and distribution automation systems.

Advanced Control Systems (ACS), Atlanta, GA, is supplying a dual CPU-based HPM-7095 master equipped with HP A900 mini-computers. NOVAC will use existing CRTs and printers and will add three additional color CRTs and two printers. Software will include the ACS RDAC operating system, area dispatch software, historical data analysis, load-management software, and others. The system will have the capability of voltage reduction and residential load management.

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Symposium...

gineers made presentations on its single-phase switching of 500-kV system. The stability during fault interruption is improved through the use of single-pole switching (SPS). BPA has incorporated four distinct methods of secondary arc extinction for SPS among 26 lines on its 500-kV network.

BPA's limits and guidelines for EMF in Oregon is 9 kV/m anywhere within the right-of-way. Under normal conditions, the 550-kV lines have an average of 3.5 kV/m—low because of hilly or mountainous terrain.

For its 1200-kV lines, BPA has adopted the limits for electric fields shown in Table 3.

Table 3. BPA limits on electric fields

Location:	kV/m
In right-of-way	9.0
Edge of R-O-W	5.0
Road crossings	5.0
Shopping center parking lots	3.5
Industrial parking	2.5

BPA has taken the stance that since it will take several more years before sufficient scientific data are available to establish whether or not EMF is a threat to public or worker health, it won't change its present standards that were developed from regional law-making processes.

Other BPA presentations included:

- Sytem reliability considerations for parallel ac and dc links.
- Planning issues.
- Equipment and line performance.

Presentations by EPRI included its work at the Transmission Line Mechanical Research Center (TLMRC) which performs integrated design processes for transmission line structures.

Magnetic field design options were also discussed. EPRI funds a number of projects dealing with this currently popular subject.

Other topics by EPRI included:

- Diversity in planning criteria among power pools.
- Six-phase power transmission.
- Substation voltage upgrading.

A similar meeting is planned for January 1993.

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VOICE OF THE ELECTRIC UTILITY INDUSTRY

LATE NEWS

Tucson Electric Power creditors on July 16 petitioned for involuntary TEP bankruptcy reorganization, a move utility leaders hoped to avoid by cooperative restructuring. Such a filing could be the industry's largest and most complex—involving $2 B in TEP debt.
The nuclear industry is assessing the NRC's maintenance rule. Regulatory guidance starts in 1993; the final rule is effective in 1996. The nuclear lobby group NUMARC is raising questions; self-monitoring is preferred.
PacifiCorp/Arizona Public Service Co.'s agreement received final regulatory approval from FERC July 10. The deal includes PacifiCorp's $221-M purchase of APS' 350-MW, coal-fired Cholla 4.
The Chicago Board of Trade hopes to trade future contracts for the SO_2 emissions program.

Top 100 Electric Utilities
21st annual report starts on page 17

3 utilities agree to divide, reorganize Colorado-Ute

PacifiCorp, PS Colorado, Tri-State would swallow Chap.11 G&T co-op

Mark T. Hoske
News Editor

DENVER—Cooperation seems to be emerging from a scuffle over the assets and customers of Colorado-Ute Electric Association.

Three utilities agreed in principle to share the assets of Colorado-Ute after filing two conflicting plans for C-U's reorganization under Chapter 11 of the bankruptcy code. C-U voluntarily filed for protection in March 1990.

Cooperation among the three utilities came after the trustee for C-U recommended that they draft a consensual plan.

Previously, Public Service Co. of Colorado and PacifiCorp together filed a plan that conflicted with a plan filed by Tri-State Generation and Transmission Association. C-U members were split in allegiance to the plans (*EL&P*, p.3, 7/91). The utilities have withdrawn

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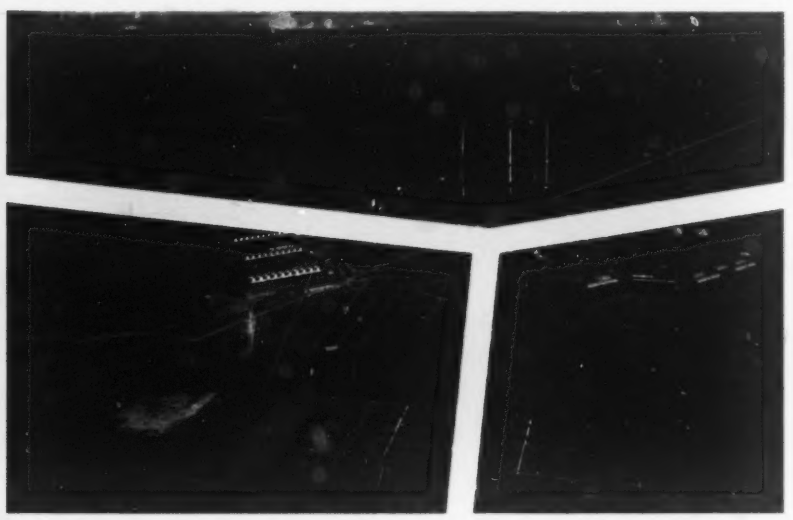


Colorado-Ute's part of Craig and Hayden coal-fired plants may be divided three ways, with Tri-State leasing 408 MW, PS Colorado acquiring 332 MW, and PacifiCorp, 243 MW. The Craig plant is shown.

Utilities' heat-rate decline ends; fuel use, reserves fall

BARRINGTON, IL— The average heat rate posted by the nation's major electric companies rose slightly in 1990, to 10,636 Btu/kWh, for only the second break in the consistent decline that began in 1982.

At the same time, reserve margins continued to fall and use of coal and gas declined.

These were three of the primary results to come out of *EL&P*'s 1991 Top 100 Electric Utilities Operating survey.

kWh sales up, coal use fell

Even though the Top 100 investor-owned electric utilities reported that their kilowatthour sales volume rose, they burned less coal and natural gas in 1990 than in 1989.

Results reversed

These results reversed last year's increase in the amounts of these fossil fuels used. The increases were confirmed by advanced statistics from the Edison Electric Institute.

Oil and nuclear fuel use increased to make up the difference.

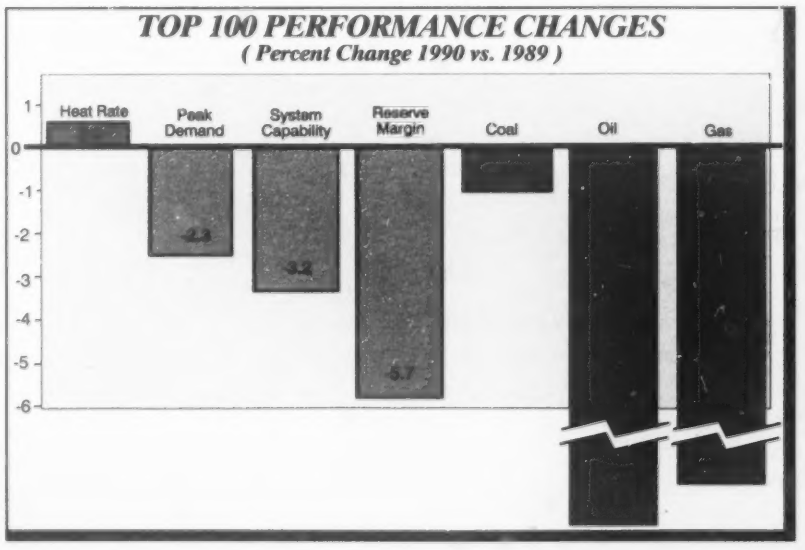
The average reserve margin for the Top 100 dropped again, as did total generating capability. Average system reserve margin declined to 18 percent in 1990 from 19 percent in 1989, but owned-reserve margin fell to 10 percent. These reductions took place even though the total of reporting utilities' '90 peak outputs fell below those of '89.

More lines

Transmission and distribution continued to grow in 1990 in all voltage and service categories.

The largest increase was in underground distribution line rated 22 kV and up, which increased 5.0 percent to 387,095 cable miles. Next-largest increase was in overhead distribution lines below 22 kV, which grew by 1.4 percent to 1,135,564 pole miles.

The smallest rise was where it may be needed most—in transmission lines—to balance service areas by allowing for power transfers. The Top 100 only added 1,199 circuit miles to lines rated below 189 kV and 1,656 circuit miles for those rated above 189 kV.



NRC to re-vote on relicensing rule Is Yankee Rowe an aging test case?

WASHINGTON—After approving standards for 20-year plant-license extensions, the Nuclear Regulatory Commission decided it would look at the issue again.

At the same time, anti-nuclear forces have attacked the first target for the rule, Yankee Rowe nuclear plant. Yankee Rowe's license will expire in the year 2000. Relicensing and aging have ignited debate over the plant. Nuclear advocates maintain it's not a test case.

Fifty-six nuclear plant licenses will expire in the next 25 years, but many utility managements expected to get additional life out of existing nuclear capacity and avoid replacing that investment right away. Without relicensing, U.S. electric reliability could be strained; the 56 plants represent about 42 percent of nuclear capacity and 8 percent of U.S. electricity supply.

Yankee Rowe, with a highly touted operating record, is the oldest running commercial nuclear reactor in the U.S. But nuclear power opponents say the unit's vessel, holding the nuclear fuel, has become too brittle from years of radiation to safely withstand the cold-water shock of an emergency shutdown.

At a July 22 public meeting in Rowe, MA, NRC staff and Yankee Atomic were scheduled to discuss embrittlement, with the opportunity for public

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